

SUPPORT FOR THE AMENDMENTS

The amendments to Claims 1 and 3 were made to clarify the claim language, and not to distinguish the claims over the prior art. New Claims 6-15 are supported in the instant specification at pages 4-10. No new matter is believed to be added by entry of these amendments. Claims 1-15 are active.

REMARKS

Applicants wish to thank Examiners Yun and Kim for the helpful and courteous discussion held with Applicants' representative on October 8, 2002. During the discussion, it was noted that Nomura teaches that a firing temperature of at least 1100°C is required to prepare the insulator layer, and at such a high temperature, the organic light emitting layer of the device of Epstein would be destroyed.

The rejection of the claims under 35 U.S.C. § 103(a) over the combination of Epstein and Nomura is respectfully traversed.

To establish a *prima facie* case of obviousness, three **basic** criteria must be met. First there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a **reasonable expectation of success**. Finally, the prior art reference (or references when combined) must teach or suggest **all the claim limitations**. (M.P.E.P. 2143) (emphasis added)

Accordingly, the Examiner must 1) find prior art references which teach or suggest all the claim limitations; 2) provide motivation to combine or modify the prior art teachings, found in the references or from knowledge generally available to those of ordinary skill in the art; and 3) show how the prior art provides for a reasonable expectation of success. However, as discussed below, there is no reasonable motivation to replace the insulator layers of Epstein with the insulator layer composition of Nomura, and if such a replacement was made,

no reasonable expectation that a light emitting device would result, because the required processing conditions (i.e., firing at 1100-1400°C) would destroy the organic light emitting layer of the device of Epstein.

Epstein describes an EL device which consists of “an electroluminescent *organic* material sandwiched between a first electrically insulating material and a second insulating material (column 2, lines 55-57; emphasis added). Suitable organic electroluminescent materials are described at column 3, lines 22-25, and the examples (column 8, line 40 to column 11, line 25). Epstein fails to describe any EL device having the structure of the claimed EL device (i.e., first and second electrode layers, first and second insulator layers, and an electroluminescent layer), where the electroluminescent layer is composed of an inorganic material.

Nomura describes an insulator layer prepared by a process which includes the steps of removing a binder at a temperature of from 200-400°C in air (column 7, lines 63-66), then sintering the device at a temperature of from 1,100 to 1,400°C (column 8, lines 10-12). In addition, Nomura indicates that firing temperatures below 1,100°C are unsuitable, because the resulting device has “insufficient densification” (column 8, lines 13-14). Thus, the insulator layer composition of Nomura must be prepared at a temperature of at least 1100°C.

Clearly, the organic light emitting layer of the EL device of Epstein could not reasonably withstand the insulator layer processing conditions described by Nomura. Thus, one would not reasonably be motivated to combine Epstein and Nomura, because the processing conditions required by Nomura to prepare the insulator layer composition would destroy the light emitting layer composition of Epstein. Moreover, even if such a combination was made, one could not reasonably fabricate a functioning organic EL according to Epstein, using the insulator layer composition of Nomura. Accordingly, the combination of Epstein and Nomura fails to suggest the claimed EL device.

Furthermore, Nomura describes a multilayered ceramic chip *capacitor* having dielectric layers comprising barium titanate, magnesium oxide, manganese oxide, barium oxide and/or calcium oxide, silicon oxide, and optionally yttrium oxide (column 2, lines 37-54). Nomura fails to describe EL devices. As discussed in the present specification at page 2, line 3 to page 3, line 19, it is recognized that not all insulating layer compositions are suitable for use in electroluminescent devices due to limitations in the thermal stability of EL devices, and the need for insulator layers which are transparent to the light emitted by the light emitting layer of the EL device. Specifically, the specification indicates that some titanate-based insulator materials, such as PbTiO_3 , require fabrication temperatures which are too high to be suitable for EL devices. Other titanate insulator materials, such as SrTiO_3 , do not have the required transparency suitable for a light emitting device. Thus, it is recognized that not all insulator compositions are suitable for use in EL devices.

As discussed above, Nomura describes ceramic chip *capacitors*, which, because they are not light emitting devices, do not require layers which are transparent. Moreover, aside from the presence of an insulator layer, the capacitors of Nomura and the organic EL devices of Epstein are completely unrelated in structure and function. Thus, there is no reasonable basis or suggestion in either Epstein or Nomura which suggests that the insulator layer compositions of Nomura would be suitable for the EL devices of Epstein, particularly since it is known, as discussed above, that other titanate-based insulators are unsuitable for use in EL devices. Accordingly, Applicants respectfully submit that there is no reasonable basis or motivation to combine Epstein and Nomura, and therefore the combination of Epstein and Nomura fails to suggest the claimed EL device.

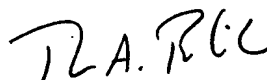
The objection to the Abstract is obviated by appropriate amendment. As amended, the Abstract has less than 150 words.

The objection to Claims 4 and 5 is obviated by appropriate amendment.

Accordingly, and for the reasons stated above, Applicants respectfully submit that the present application is now in condition for allowance, and early notification thereof is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Norman F. Oblon
Attorney of Record
Registration No. 24,618

Thomas A. Blinka, Ph.D.
Registration No. 44,541



22850

Tel.: (703) 413-3000
Fax: (703) 413-2220
NFO/TAB/cja
I:\atty\tab\200083us-AM.doc

Marked-Up Copy

Serial No: 09/731,866

Amendment Filed on: HEREWITH

IN THE CLAIMS

--1. (Amended) An EL device [having a structure in which] comprising a first electrode [formed according to a predetermined pattern], a first insulator layer, [an electroluminescence-producing] a light emitting layer, a second insulator layer and a second electrode layer [are] successively stacked on an electrical insulating substrate, wherein:

at least one of said first insulator layer and said second insulator layer [contains as a main component] comprises barium titanate, [and as subordinate components] magnesium oxide, manganese oxide, [yttrium oxide,] at least one oxide selected from barium oxide and calcium oxide, [and] silicon oxide, and optionally [with] yttrium oxide,

wherein the [ratios] amount of magnesium oxide, manganese oxide, yttrium oxide, barium oxide, calcium oxide and silicon oxide with respect to 100 moles of barium titanate [being] is:

MgO: 0.1 to 3 moles,

MnO: 0.05 to 1.0 mole,

Y₂O₃: 1 mole or less,

BaO+CaO: 2 to 12 moles, and

SiO₂: 2 to 12 moles[,

as calculated on MgO, MnO, Y₂O₃, BaO, CaO, SiO₂ and BaTiO₃ bases, respectively].

3. (Amended) The EL device according to claim 1 or 2, [which contains] wherein BaO, CaO and SiO₂ [in a form represented by] are present in at least one of the first and second insulator layers in the form of (Ba_xCa_{1-x}O)_ySiO₂ where $0.3 \leq x \leq 0.7$ and $0.95 \leq y \leq 1.05$ and in an amount of 1 to 10% by weight with respect to the sum of the weights of BaTiO₃, MgO, MnO and Y₂O₃.

4. (Twice Amended) The EL device according to claim 2, wherein said first electrode [contains] comprises one or two or more of Ni, Ag, Au, Pd, Pt, Cu, [Ni,] W, Fe, and Co or any one of Ag-Pd, Ni-Mn, Ni-Cr, [Ni-Cr,] Ni-Co and Ni-Al alloys.

5. (Twice Amended) The EL device according to claim 3, wherein said first electrode [contains] comprises one or two or more of Ni, Ag, Au, Pd, Pt, Cu, [Ni,] W, Fe, and Co or any one of Ag-Pd, Ni-Mn, Ni-Cr, [Ni-Cr,] Ni-Co and Ni-Al alloys.

6-15. (New).--

IN THE ABSTRACT

--The [invention provides an] EL device of the present invention [having] has a structure in which a first electrode [12 formed according to a predetermined pattern], a first insulator layer [13], an electroluminescence-producing light emitting layer [14], a second insulator layer, [15] and a second electrode layer [16] are successively stacked on an electrical insulating substrate [11]. At least one of the first insulator layer [13] and the second insulator layer [15 contains] has as a main component barium titanate and [as subordinate components] in addition 0.1 to 3 mole % magnesium oxide, 0.05 to 1.0 mole % manganese oxide, no more than 1 mole % yttrium oxide, [at least one oxide selected from] 2 to 12 mole % of barium oxide and calcium oxide, and 2-12 mole % silicon oxide. [The ratios of magnesium oxide, manganese oxide, yttrium oxide, barium oxide, calcium oxide and silicon oxide with respect to 100 moles of barium titanate are:

MgO: 0.1 to 3 moles,

MnO: 0.05 to 1.0 mole,

Y₂O₃: 1 mole or less,

BaO+CaO: 2 to 12 moles, and

SiO₂: 2 to 12 moles,

as calculated on MgO, MnO, Y₂O₃, BaO, CaO, SiO₂ and BaTiO₃ bases, respectively].--